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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 9239.12-2021

Mechanical vibration - Rotor balancing - Part 12: Procedures and tolerances for rotors with flexible behaviour

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Foreword

GB/T 9239 "Balance of Mechanical Vibrating Rotors" has or plans to publish the following parts.

---Part 1.Introduction 1);

---Part 2.Vocabulary 2);

---Part 11.Balance method and tolerance of rotors with rigid characteristics 3);

---Part 12.Balance method and tolerance for rotors with flexible characteristics 4);

---Part 13.On-site balancing guidelines and safety protection for large and medium-sized rotors 5);

---Part 14.Evaluation Procedures for Balance Error 6);

---Part 21.Description and Evaluation of Balancing Machine 7);

---Part 23.Balancing machine protective cover and other protective measures for measuring stations 8);

---Part 31.Machine Unbalance Sensitivity and Unbalance Sensitivity 9);

---Part 32.Key criteria for balancing shafts and mating parts 10).

This part is Part 12 of GB/T 9239.

This section was drafted in accordance with the rules given in GB/T 1.1-2009.

This part replaces GB/T 6557-2009 "Methods and Criteria for Mechanical Balancing of Flexible Rotors". Compared with GB/T 6557-2009, except

The main technical changes besides editorial changes are as follows.

--- In 4.2, a technical text description has been added (see 4.2, 4.2 in the.2009 edition);

---In 9.2.3, 2 paragraphs of technical text descriptions have been added (see 9.2.3, 9.2.2 in the.2009 edition);

--- Deleted Appendix F "Allowable equivalent mode unbalance calculation example" and Appendix H "GB/T 6444-1995 on flexibility

Definition of rotor terms" (see Appendix F and Appendix H of the.2009 edition).

The translation method used in this part is equivalent to ISO 21940-12.2016 ``Balance of Mechanical Vibrating Rotor Part 12.Flexible

The balance method and tolerance of the rotor.

The Chinese documents that have a consistent correspondence with the international documents cited in this section are as follows.

---GB/T 2298-2010 Mechanical vibration, shock and condition monitoring vocabulary (ISO 2041.2009, IDT)

---GB/T 9239.14-2017 Mechanical vibration rotor balance Part 14.Evaluation procedures for balance errors (ISO 21940-

14.2012, IDT)

---GB/T 9239.32-2017 Mechanical vibration rotor balance Part 32.Key criteria for the balance of shafts and mating parts

(ISO 21940-32.2012, IDT)

1) Revise the usage and application guide of GB/T 29714-2013 mechanical vibration balance balance standard.

2) Revise GB/T 6444-2008 mechanical vibration balance vocabulary.

3) Revision of GB/T 9239.1-2006 Mechanical vibration constant (rigid) rotor balance quality

requirements Part 1.Specification and balance tolerance inspection.

4) Revision of GB/T 6557-1999 The methods and criteria for mechanical balancing of flexible rotors.

5) Revise GB/T 28785-2012 the criteria and protection for on-site balancing of large and medium-sized rotors with mechanical vibration.

6) Revision of GB/T 9239.2-2006 Mechanical vibration constant (rigid) rotor balance quality requirements Part 2.Balance error.

7) Revision of GB/T 4201-2006 description inspection and evaluation of balancing machines.

8) Revision of GB 12977-2008 balancing machine protective cover and other protective measures for measuring stations.

9) Revise GB/T 19874-2005 mechanical vibration machine unbalance sensitivity and unbalance sensitivity.

10) Revision of GB/T 16908-1997 key criteria for balancing mechanical vibration shafts and mating parts.

---GB/T 2298-2010 Mechanical vibration, shock and condition monitoring vocabulary (ISO 2041.2009, IDT)

---GB/T 9239.14-2017 Mechanical vibration rotor balance Part 14.Evaluation procedures for balance errors (ISO 21940-

14.2012, IDT)

---GB/T 9239.32-2017 Mechanical vibration rotor balance Part 32.Key criteria for the balance of shafts and mating parts

(ISO 21940-32.2012, IDT)

This part is proposed and managed by the National Mechanical Vibration, Shock and Condition Monitoring Standardization Technical Committee (SAC/TC53).

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Introduction

The purpose of rotor balancing is to operate satisfactorily when installed on site. Here, "satisfactory operation" means that the

The vibration caused by the balance is not greater than the acceptable vibration amplitude. For rotors with flexible characteristics, it also means that up to the maximum operating speed

The deflection of the rotor at any speed is not greater than the allowable value.

Most rotors are balanced in the manufacturing plant before the machine is assembled, because after the machine is assembled, generally only a limited approach can be reached.

son. Moreover, the rotor balancing is usually the stage when the user accepts the rotor. Therefore, although the purpose of balance is that the machine can be fully

Operate deliberately, but it is usually the initial assessment of the rotor balance quality on the balance equipment. In most cases, operate satisfactorily on site

It is to evaluate the vibration caused by various reasons, and the fundamental frequency vibration is mainly considered in the balance equipment.

This section categorizes rotors according to their balance requirements, and develops methods for assessing residual unbalance.

This section also explains how to guide from the vibration limit specified for the assembled and installed machine, or from the unbalance limit specified for the rotor.

Applicable guidelines on balancing equipment. If no such limits are available, this section explains how to derive these limits from the following standards.

If you want to use the vibration limit, it can be derived from ISO 10816 (series standard) and ISO 7919 (series standard); if you want to use

The balance can be derived from ISO 21940-11.ISO 21940-11 is about the balance quality of a rotating rigid body, and cannot be directly used to have

Rotors with flexible characteristics, because the rotors with flexible characteristics may have obvious bending deformation. In this part, the ISO 21940-11

The criterion is used for the method of flexible characteristic rotors.

Sometimes, a well-balanced rotor fails due to the resonance of the supporting structure in the field. Small damped structures are in resonance or close to

Under resonance conditions, small imbalances can also produce excessive vibration response. In this case, a more practical approach is to change the natural frequency of the structure.

Rate or damping, rather than achieving a very good balance, but may be difficult to maintain for a long time (see ISO 21940-31).

Mechanical vibration rotor balance